ECI 721: Technology and Informal Learning Environments

In Workflow
1. 13ECI Grad Head (jklee@ncsu.edu)
2. CED CC Coordinator GR (mmmartin@ncsu.edu)
3. CED CC Meeting GR (mmmartin@ncsu.edu)
4. CED CC Chair GR (aclark@ncsu.edu)
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13. PeopleSoft (none)

Approval Path
   John Lee (jklee): Approved for 13ECI Grad Head
2. Tue, 21 Mar 2017 18:32:52 GMT
   Mary Morris (mmmartin): Approved for CED CC Coordinator GR
   Mary Morris (mmmartin): Approved for CED CC Meeting GR
   Aaron Clark (aclark): Approved for CED CC Chair GR
5. Wed, 22 Mar 2017 14:05:09 GMT
   Mary Morris (mmmartin): Approved for CED Final Review GR
   Ellen Vasu (ellen_vasu): Approved for CED Dean GR
7. Sat, 08 Apr 2017 13:41:50 GMT
   Kevin Oliver (kevin_oliver): Approved for kmoliver
8. Mon, 10 Apr 2017 12:19:49 GMT
   Melissa Nosbisch (mlnosbis): Approved for ABGS Coordinator
9. Tue, 18 Apr 2017 16:36:01 GMT
   Kevin Oliver (kevin_oliver): Approved for kmoliver
10. Thu, 20 Apr 2017 12:41:12 GMT
    Melissa Nosbisch (mlnosbis): Approved for ABGS Meeting

New Course Proposal
Date Submitted: Sat, 18 Mar 2017 15:09:49 GMT

Viewing: ECI 721 : Technology and Informal Learning Environments
Changes proposed by: kmoliver

Change Type
Major

Course Prefix
ECI (Curriculum and Instruction)
Course Number
721

Cross-listed Course
No

Title
Technology and Informal Learning Environments

Abbreviated Title
Tech & Inf Lrng Env

College
College of Education

Academic Org Code
Curriculum, Instruction & Counselor (13ECI)

CIP Discipline Specialty Number
13.0301

CIP Discipline Specialty Title
Curriculum and Instruction.

Term Offering
Fall Only

Year Offering
Offered Every Year

Effective Date
Fall 2017

Previously taught as Special Topics?
Yes

Number of Offerings within the past 5 years
2

<table>
<thead>
<tr>
<th>Course Prefix/Number</th>
<th>Semester/Term Offered</th>
<th>Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECI 719-601</td>
<td>Fall 2016</td>
<td>11</td>
</tr>
<tr>
<td>ECI 719-603</td>
<td>Spring 2016</td>
<td>6</td>
</tr>
</tbody>
</table>

Course Delivery
Distance Education (DELTA)
Online (Internet)

Grading Method
Graded/Audit

Credit Hours
Course Length
16 weeks

Contact Hours
(Per Week)

Component Type          Contact Hours
Lecture and Lab          3

Course Is Repeatable for Credit
No

Instructor Name
Kevin Oliver

Instructor Title
Associate Professor

Grad Faculty Status
Full

DELTA/Online Enrollment:
Open when course_delivery = distance OR course_delivery = online OR course_delivery = remote

<table>
<thead>
<tr>
<th>Delivery Format</th>
<th>Per Semester</th>
<th>Per Section</th>
<th>Multiple Sections?</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>LLB</td>
<td>20</td>
<td>20</td>
<td>No</td>
<td>Course to be offered once per year in fall. Expected to attract primarily doctoral students in the TELS department, and some interested master's students in our online DELTA master's program in Digital Learning and Teaching.</td>
</tr>
</tbody>
</table>

Course Prerequisites, Corequisites, and Restrictive Statement
None

Is the course required or an elective for a Curriculum?
Yes

Which Curricula are Affected?

<table>
<thead>
<tr>
<th>SIS Program Code</th>
<th>Program Title</th>
<th>Required or Elective?</th>
</tr>
</thead>
<tbody>
<tr>
<td>13TELSLDT</td>
<td>Learning Design and Technology</td>
<td>Elective</td>
</tr>
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</table>

Catalog Description
Survey of theory and research grounding popular informal after-school technology environments, such as computer clubhouses, music studios, video clubs, coding camps, robotics clubs, and makerspaces. Examination of strategies for planning experiential, hands-on activities supportive of informal learning, sourcing necessary materials, outfitting spaces, facilitating student design and collaboration, and engaging the community and other resources to sustain facilities/clubs.

Justification for new course:
A large area of research in the learning sciences, a new focus area for our department of Teacher Education and Learning Sciences (TELS), is informal learning. It is important for doctoral students in our department and in particular our doctoral program in Learning Design and Technology to know something about this area of research and the multiple learning environments that have been developed and studied. Considerable research funding is available to faculty wishing to study informal learning environments through the NSF and other outlets, so the more we can expose our doctoral students and future faculty to this area of research, the better positioned they will be to apply for and secure this type of funding.

Does this course have a fee?

No

Consultation

<table>
<thead>
<tr>
<th>College(s)</th>
<th>Contact Name</th>
<th>Statement Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>College of Engineering</td>
<td>James Lester</td>
<td>I asked James Lester in Computer Science if this course with some basic programming requirements (entry-level Scratch language) would conflict with anything taught in CS, and he indicated no. He stated, “This sounds like a great course! Thanks for checking on overlap. I’m not aware of any computer science course that this would conflict with, so I think you’re good to go.”</td>
</tr>
</tbody>
</table>

Instructional Resources Statement

Dr. Oliver will be teaching this course as part of his regular 2-2 course rotation. Our program has recently hired new faculty, allowing him to develop and teach this course at the doctoral level. Previously, our doctoral program area of study (Learning Design and Technology) only had one doctoral-level course (ECI 716 instructional design), and this will assist us in building new courses for the doctoral program as we have planned.

Course Objectives/Goals

High-Level Goals

1. Encourage students to gain facility with the technology surrounding informal after-school technology programs (e.g., circuit boards, robotics, fabrication).
2. Develop student confidence to lead informal after-school technology programs (i.e., “I’ve learned the basics. I can do this!”).
3. Motivate students to get involved in informal after-school technology programs (i.e., “This is really beneficial for kids. I want to do this!”).

Student Learning Outcomes

- Differentiate between informal/non-formal/formal education typologies, and extended/enriched/intentional learning, and give examples of when each may be appropriate.
- Describe some of the historical precedents for informal learning in the United States (e.g., public understanding of science programs, development of science centers/museums, seminal conferences and journals).
- Describe technology-enhanced curricular activities associated with different informal learning cases, and discuss potential learning benefits and career connections associated with these activities.
- Critique research in different informal learning settings and propose new research questions for further examining those settings.
- Experiment and gain facility with technologies employed in different informal learning settings.
- Describe overlaps and intersections between informal learning cases (e.g., computer clubhouses involving similar work as digital media camps, robotics work requiring skills broached in coding camps, some makerspaces involving digital media work and robotics play, the ability to fabricate parts for use in robotics, etc.).
- Describe historical and philosophical underpinnings of informal learning (e.g., Montessori/Pestalozzi schools, Dewey’s progressive education, Piaget’s constructivist learning, Papert’s constructionist learning, and Kolb’s experiential learning).
• List and describe recommended steps in the design thinking process and discuss strategies for supporting students working through the process.
• List and describe the different components of computational thinking (e.g., decomposition, algorithms), and give examples of each component in different informal learning cases (e.g., what does decomposition look like in a computer clubhouse? in a coding camp?).
• Apply strategies to encourage student reflecting on the learning process during informal learning (e.g., journals, design notebooks, blogs and other social media, CATs, plussing sessions, peer conversations).
• Apply strategies to encourage student sharing or collaborating to build on one another’s ideas and understandings in informal learning settings (e.g., reporting conferences, plussing sessions, peer teaching, relay projects).
• Describe research-based strategies for aligning out-of-school learning with in-school learning, and the benefits to learning of doing so.
• Provide examples of how different informal learning cases (coding camps, multimedia camps, robotics clubs, etc.) tie back into curricular areas.
• Apply inquiry and design processes recommended for informal learning environments (e.g., ideation-prototyping-testing), related templates or scaffolds (e.g., design notebooks, concept maps, vee diagrams), and facilitative strategies (e.g., questioning, encouraging observations and theorizing, inviting participation, holding debriefing and plussing sessions, avoiding over-teaching in lieu of questioning) to guide students.
• Plan scaffolded spaces and projects that can work autonomously without a full staff of facilitators.
• List a variety of places informal learning environments have been implemented (e.g., school libraries, museums, classrooms, mobile vehicles, camp computer labs).
• Describe characteristics of informal learning spaces (e.g., tables for group work, storage solutions). Select appropriate materials and equipment to meet the goals of a particular informal learning environment.
• Describe sources of and strategies for community engagement to encourage further support of your informal learning environment (e.g., asset mapping, marketing through events and social media, connecting with local STEM advocates in your area such as museum staff).
• Describe strategies for sustaining an informal learning environment, including: student recruitment tactics within the school (e.g., display boards, advertisements), mentor professional development, and tapping into varied funding/donation streams.
• Describe indicators of quality commonly measured in informal learning settings (e.g., choice, authenticity) and strategies for benchmarking progress toward those goals (e.g., surveys, observations).

**Student Evaluation Methods**

<table>
<thead>
<tr>
<th>Evaluation Method</th>
<th>Weighting/Points for Each</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discussion</td>
<td>18</td>
<td>9 video-based discussions using the FlipGrid tool in which students share thoughts, ideas, and experiences, drawing on course materials. Students must reply to the instructor’s question prompts and comment on peer videos for full credit.</td>
</tr>
<tr>
<td>Project</td>
<td>70</td>
<td>7 projects associated with different informal learning environments (e.g., design a Web site--computer clubhouses, program a game using Scratch--coding camps).</td>
</tr>
<tr>
<td>Quiz</td>
<td>6</td>
<td>16 weekly quizzes are programmed into Moodle for students to take, drawing on assigned readings for that week.</td>
</tr>
</tbody>
</table>
Participation

6

At the end of the course, the instructor will download Moodle analytics for each student. The expectation is for students to fully engage with course content each week by watching any posted videos, reading posted articles, and browsing other shared resources. Students who rarely log into the course or regularly skip entire topics without engaging with content will lose these points.

Topical Outline/Course Schedule

<table>
<thead>
<tr>
<th>Topic</th>
<th>Time Devoted to Each Topic</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session 1: Introduction to Informal Learning--Definitions, History</td>
<td>1 week</td>
<td>Watch: What is Inf Lrng, Sparking Student Interests&lt;br&gt;Read: Herr-Stephenson (pp. 21-37), Dib, Fordham, NRC (chap 1 and 6), Sefton-Green (chap 2)&lt;br&gt;Take: Quiz 1&lt;br&gt;Participate: FlipGrid 1, Introductions</td>
</tr>
<tr>
<td>Session 2: Informal Learning Case 1, The Computer Clubhouse</td>
<td>1 week</td>
<td>Watch: Clubhouse Tour, Clubhouse Documentary&lt;br&gt;Read: Girod, Kafai text (Introduction), Sefton-Green (chap 5)&lt;br&gt;Take: Quiz 2&lt;br&gt;Project 1: Weebly Web Site Development</td>
</tr>
<tr>
<td>Session 3: Theoretical Foundations of Informal Learning, Guiding Principles</td>
<td>1 week</td>
<td>Watch: videos on Kolb, Dewey, and Papert&lt;br&gt;Read: Herr-Stephenson (pp. 5-9), Kafai text (chap 1), Kolb, Kurti, Martinez, Martinez text (chap 2), NRC (chap 2)&lt;br&gt;Take: Quiz 3&lt;br&gt;Participate: FlipGrid 1, Principles</td>
</tr>
<tr>
<td>Session 4: Informal Learning Case 2, Coding Camps (Games, Animations)</td>
<td>1 week</td>
<td>Watch: Coding Camps for Kids, Kids Can Code&lt;br&gt;Read: Campe, Daly, Kafai text (chap 4, 12), Maloney, Martinez text (chap. 7 pp. 130-146), Mote, Prayaga, Resnick&lt;br&gt;Take: Quiz 4&lt;br&gt;Project 2: Scratch Game</td>
</tr>
<tr>
<td>Session 5: Design and Computational Thinking in Informal Learning</td>
<td>1 week</td>
<td>Watch: Four videos on design/comp thinking&lt;br&gt;Read: Becker, Camacho, Curzon, Grover, Long, Martinez text (chap 3), NRC (chap 3), Selby&lt;br&gt;Take: Quiz 5&lt;br&gt;Participate: FlipGrid 3, Thinking Processes</td>
</tr>
<tr>
<td>Session 6: Informal Learning Case 3, Coding, Physical Computing</td>
<td>1 week</td>
<td>Watch: BBC, Monk, Make Use Of&lt;br&gt;Read: Camarata, Kafai text (Chapter 5), Martinez text (Chap. 7 pp. 109-129), Moran, Przybylla&lt;br&gt;Take: Quiz 6&lt;br&gt;Project 3: Scratch and PicoBoard</td>
</tr>
<tr>
<td>Session 7: Promoting a Culture of Reflecting, Sharing, Collaborating</td>
<td>1 week</td>
<td>Watch: MIT peer learning videos&lt;br&gt;Read: Angelo, Bedley, Bielaczyc, Chang, Gogek, Kafai text (chap 7), NRC (chap 3), Yokana, Werner&lt;br&gt;Take: Quiz 7&lt;br&gt;Participate: FlipGrid 4, Informal Culture</td>
</tr>
<tr>
<td>Session 8: Informal Learning Case 4, Digital Media Camps (Videos, Music, Stories)</td>
<td>1 week</td>
<td>Watch: Castro, Gerstein, Hobbs, Kafai (Chapter 6), Martinez, Sefton-Green (Chapters 4, 6), Zoch&lt;br&gt;Take: Quiz 8&lt;br&gt;Project 4: GoAnimate</td>
</tr>
<tr>
<td>Session 9: Connecting Formal and Informal Learning</td>
<td>1 week</td>
<td>Read: Fallik, Hofstein, Tran&lt;br&gt;Take: Quiz 9&lt;br&gt;Participate: FlipGrid 5, Connections</td>
</tr>
</tbody>
</table>
Session 10: Informal Learning Case 5, Robotics Clubs
1 week
Watch: YouTube videos on robotics platforms
Read: Bers, D’Agustino, Flannery, Gura, Gura, McIntyre, Weinberg, Williams
Take: Quiz 10
Project 5: SpinBot
Session 11: The Mentor’s Role
1 week
Read: Allen, Barrow, D’Agustino, Garcia-Martinez, Guerra, Hsu, Kafai (Chapter 8, pp. 127-130), Martinez (Chap. 5)
Take: Quiz 11
Participate: FlipGrid 6, Mentoring Informal
Session 12: Informal Learning Case 6, Makerspaces, Copper/Ink/Soft Circuits
1 week
Watch: Exploratorium Tinkering Pedagogy 1, Intro to Various Circuit Projects, What is a Makerspace
Read: Abram, Cavalcanti, Martinez (Chap. 1), Petrich, Plemmons, Wylde
Take: Quiz 12
Project 6: Circuit Work
Session 13: Space and Materials Considerations
1 week
Watch: Exploratorium Designing for Tinkerability
Read: Cooper, Davis, Good, Kurti, Martinez (Chap. 6, 8, 9), NRC, Traphagen
Take: Quiz 13
Participate: FlipGrid 7, Informal Spaces
Session 14: Informal Learning Case 7, Makerspaces, Fabrication
1 week
Watch: Exploratorium Tinkering Pedagogy 2, Maker Methodology, YouTube videos on fabrication
Read: Blikstein, Bull, Hertz, Martinez (Chap. 7 pp. 91-108), Pang, Tech & Learning
Take: Quiz 14
Project 7: 3D Design
Session 15: Community Engagement
1 week
Watch: STEM Night/Camp Promo Video Examples
Read: Garcia-Lopez, Kafai (chap 2-3, 9), Kakli (chap 2), Martinez (chap 11), Peterson, Wallace
Take: Quiz 15
Participate: FlipGrid 8, Community
Session 16: Evaluating Impact
1 week
Read: Kafai (Chapters 10-11), Bohnert, Gutwill, Loertscher, Palmer, Siaca
Take: Quiz 16
Participate: FlipGrid 9, Evaluation

Syllabus
ECI 721-601 Fall 2017.docx

Additional Documentation

Additional Comments

minosbis 3/22/2017: No overlapping courses, so no consultation required.
1) Are there too many component types listed? It seems appropriate to list Lecture only in the "Contact Hours" field. Note also that this should be contact hours for week, so the numbers listed seem too high for a 3 credit course.
2) I edited the prerequisite field to show "None" since 700-level courses are already restricted to students in graduate standing only.
3) Evaluation methods on the CIM form should match the Assignments/Projects list in syllabus

pjharrie - 4/3/17 - I don't know if the values given in the grading are for each assignment, but they should be the total percentage for each category that adds up to 100.

ABGS Reviewer Comments:
- The course will be offered exclusively online, but states that it will attract doctoral students. Is the TELS doctoral program available online? At least in our department/college, PhD students have residency requirements and are generally discouraged from taking online courses.

Course Reviewer Comments
jklee (Mon, 16 Jan 2017 12:35:23 GMT): I see you said the course is not required or an elective of a curriculum. Seems like that would be a yes for the LDT PhD at least as an elective. Need to double check that the syllabus has all the required information. I did notice that the link on the academic integrity statement did not work (http://studentconduct.ncsu.edu/policies-and-procedures). According to the university regs (https://policies.ncsu.edu/regulation/reg-02-20-07) the student conduct link is https://policies.ncsu.edu/policy/pol-11-35-01 Otherwise looks good.

mmmartin (Tue, 17 Jan 2017 19:57:49 GMT): Rollback: Suggest edits and formats - review with DGP Jessica DeCuir-Gunby

kmoliver (Sat, 08 Apr 2017 13:41:22 GMT): Per minosbis comments, I updated the following: 1) made "lecture" the only component type and reduced contact hours to 3 2) no change necessary 3) verified that the evaluation methods on CIM form do match the assignments/projects listed in the attached syllabus Per pjharrie comment, I updated the following: 1) replaced the "per item" weighting under student evaluation methods to the total weight for a given category, totaling to 100 total course points

kmoliver (Tue, 18 Apr 2017 16:35:48 GMT): Responding to ABGS reviewer comment: The TELS doctoral program in Learning Design and Technology is not online, however we do anticipate some of the students in our fully online master's program by the same name will be interested in taking this course, so online is the preferred format to allow these remote students to take this course as well. Regarding residency, I'm not aware of any problems with doc students taking online courses and having that effect their residency. I believe residency is just a matter of continuous enrollment over a certain number of semesters, regardless of online versus face-to-face status.

Key: 13349